

The Builder.

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HE production in England of a large and elaborate work on classic art is so great a novelty at this time, that we hasten to welcome Mr. Penrose's "Investigation of the Principles of Athenian Architecture," which has just now been published. But for the Society of Dilettanti we should not have had this. It is not likely that any individuals would have incurred the necessary outlay with the certainty almost (we grieve to say it) of so limited a sale as would render loss inevitable. The Dilettanti Society, as most of our readers know, is composed of gentlemen devoted to art and antiquities. It is now in its 118th year, and consists of forty-two members, who dine together on the first Sunday in every month during the season. Walpole, speaking in 1743 of this club, in connection with the establishment of an opera, says, "the nominal qualification [to be a member] is having been in Italy, and the real one being drunk." We need not say this does not apply now. The two oldest members are the Duke of Somerset (1799), and Lord Northwick (1802); the two youngest are Mr. Broderip and the Marquis of Northampton (1851). It has assisted in the production of several fine works, and the book now before us is one of them. This is illustrated with numerous large engravings and vignettes, without regard to expense, which makes us more regret that so many pages of the letter-press, at all events in our copy, are "smudged," apparently through not being sufficiently dried before binding.

We shall confine ourselves on the present occasion to a brief exposition of the origin, object, and contents of the works.

In 1845 Mr. Penrose visited Athens, and remained there some months. In the spring of the following year, making reference to the ascertained fact that traces of the most refined thought and subtle optical principles were to be found in the Greek buildings of the best time, entirely overlooked by Stuart and Revett, and not adequately noticed in any later work,—he proposed to the trustees of the British Museum to provide himself with the requisite instruments of the best quality, and to give his services to the investigation of them free of all personal expenses (the results to be handed to the trustees for publication if they should think fit), provided he were sent out armed with their sanction and authority. He considered that it would require five or six months' work thoroughly to examine the Parthenon and the Temple of Theseus; that the expense in scaffolding and assistance would amount to about 50*l.*; and he said that he would be quite satisfied if her Majesty's minister were authorised to supply these expenses in furtherance of the work. The trustees felt that the undertaking proposed was foreign to their purpose, and were obliged to decline it. But one of the trustees, who was also secretary to the society of *dilettanti*, conveying the proposition to that body, it was

immediately accepted, and thence the work in question. Its full title is, "An Investigation of the Principles of Athenian Architecture, or the Results of a recent Survey conducted chiefly with reference to the optical refinements exhibited in the construction of the ancient buildings at Athens. By Francis Crammer Penrose, Architect, M.A." It may be described in brief as a treatise "on the systematic deviations from ordinary rectilinear construction, found in the principal works of Greek architecture, which arise out of and pervade the entire design of the building." The aim proposed is, 1st, the establishment of the fact; 2ndly, the determination of the exact nature of these deviations; and, 3rdly, to aid in arriving at some knowledge of the theory on which they were made. Of the general character of the investigations on which this work is founded our readers are already informed, and if we give them an outline of the table of contents, they will be able to judge of the extent to which they have been carried out. Chapter 1 contains a general description of the Acropolis of Athens; 2 treats of the iconographic and orthographic proportions of the Parthenon; 3, of the discovery of the curvature of the horizontal lines in that building, and the jointing of the stones in Greek architecture generally; 4 speaks of the inclination of the columns; 5, of the Entasis; 6 gives details of the construction of the Parthenon; and 7 is on the curves of Athenian mouldings; 8 and 9 treat of the Polychromy of the Parthenon and the Propylæa; 10 gives a description of the latter building; 11 treats of the Theseum; 12 of the Temple of Jupiter Olympus; and 13, of the remains of an earlier Parthenon. The 14th and last is on the theory of the Optical Corrections adopted by the Greek architects.

We will mention that in the case of the Propylæa, the drawings from which the plates have been engraved—and very careful drawings they are—were prepared by Mr. T. J. Willson, who was the companion of the author in Athens.

Vitruvius is the earliest writer who alludes to the curvature of what are usually considered horizontal lines, and he points out that the stylobate (or enabstructure on which the columns rest) should rise gradually from the ends towards the centre ("as it would otherwise appear like the bed of a channel"), and that the capitals of the columns should not be placed in the same horizontal level, but should deviate from the straight line in proportion to the addition given to the centre of the stylobate.

The first notice of the fact in Athens was made in 1837, when Mr. John Pennethorne, an English architect, discovered the curvature, and afterwards published his observations in

the shape of a pamphlet. The entasis, or swell in the upright lines of the columns of the Parthenon, was established by Professor Cockerell in 1810, and the inclination of the columns, by Professor Donaldson about 1829. It is singular how few of us observe even what we see!

"The flattest curve which has ever been applied to any architectural line for the confessed purpose of pleasing the eye is that, probably, which forms the entasis of the columns of the Erechtheum. In these, the amount of departure from a straight line, or to speak mathematically, the sagitta of the curve, is only '0195 in 21'12, which is equivalent to '106 in 100 feet. The value of the increment of curvature corresponding to the flank of the Parthenon is '156 in 100 feet, so that the curve of the column of the Erechtheum,—a curve confessedly productive of the impression of beauty,—is scarcely more than two-thirds as great as that of the stylobate of the Parthenon; we cannot, therefore, deny that the curvature of the horizontal lines may produce some optical effect of beauty."

It is not unreasonable to suppose that those travellers who have wondered why the fronts of the Greek buildings were so much less "dry and hard" than our imitations of them, must have felt (however unconsciously) the beauty of the horizontal curvature. Without the entasis the outlines of columns seem concave instead of straight. It was applied so delicately, however, by the Greeks, that it is scarcely appreciable, except by its indirect effects. The Italian architects, of the Revival, magnified it very absurdly, making the diameter of the column at about one-third of its height actually larger than at the base. In no one of the Athenian examples, except Jupiter Olympius, is the profile of the column even perpendicular at the base,—the entasis is kept subordinate to the diminution. Mr. Penrose found the entasis in every case so nearly resembling one of the forms of the Conic Sections, viz., the hyperbola, that he is satisfied this was the curve used in the Athenian structures. The use of the hyperbolic or parabolic curves in the Greek mouldings produces a wonderful variety of light and shade.

The greatest amount of curvature in the horizontal lines of Greek structures was found in the new or Hecatompedon Parthenon, and in the Propylæa. In the latter, however, the curve only occurs in the entablature, the line of the steps being straight and level. The measurements are given in the two first columns of the following table; and if the length of the curved lines in the above-mentioned cases be all either increased or diminished, as the case may require, to an uniform length of 100 feet (the rise of the centre of the line always preserving its proportions to the length), the third column will give the relative amount of rise.

| Buildings. | Actual length of the front or flank, measured. | Actual rise above a straight line joining the extremities. | Proportional rise corresponding to a length of 100 feet. |
|---|--|--|--|
| 1. <i>Jupiter Olympian</i> — | | | |
| Front | 351.2 | .25 nearly | .07 |
| 2. <i>Sub-temple of the Parthenon</i> — | | | |
| Front | 191.2 | .150 | .165 |
| Flank | 271 | .233 | .106 |
| 3. <i>Theseum</i> — | | | |
| Front | 47 | .093 | .130 |
| Flank | 164.2 | .101 | .130 |
| 4. <i>Parthenon</i> — | | | |
| Front | 107.3 | .225 | .225 |
| Flank | 229.1 | .156 | .145 |
| Entablature from eastern front | 160.2 | .171 | .171 |
| Doitto on flanks, restored | 227 | .307 | .135 |
| 5. <i>Propylæa</i> — | | | |
| Entablature from eastern portico | 64.1 | .119 | .173 |

It will be seen from the above table that the
* London: Longman and Co., and John Murray.

curvature of the temple of Theseus is about the same as that of the earlier Parthenon; while in